

NW Regional Public Utility Behavior Based Energy Efficiency Programs Conference Call
July 17, 2012

Home Energy Reports: Three Year Review

Puget Sound Energy
Joel Smith and Bobbi Wilhelm

Facilitated by Summer Goodwin, BPA





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Program Overview

- October 2008
 - Launched reports to 39,755
- October 2010
 - Added 91,828 households (C-7 initiative)
 - Reduced original pilot by 10k to measure persistence
 - External (KEMA) evaluation report
- January 2011
 - Added an additional 27,200 households
- October 2011
 - Regulatory ruling to allow claimed energy savings
- April 2012
 - Three year evaluation (KEMA)

PUGET SOUND ENERGY
The Energy To Do Great Things

Home energy report

REPORT PERIOD: 10/01/08 - 10/31/08
Account number: 1234567890

Test Customer
12345 Main Street
Anytown, WA 99999

ABOUT THIS REPORT This report contains information and analysis about your electricity and natural gas consumption. It includes comparisons to your neighbors to help you better understand your energy usage. We hope the information in this report helps you make smart choices to reduce your use and bills.

WHY AM I RECEIVING IT? 40,000 Puget Sound Energy customers are receiving these reports as part of a pilot program. Only you can see your personal information.

October Neighbor Comparison | You used **3% LESS** energy than your efficient neighbors.

YOU	1,182 *
EFFICIENT NEIGHBORS	1,217
ALL NEIGHBORS	1,571

HOW YOU'RE DOING:

GREAT 😊😊

GOOD 😊

BELOW AVERAGE 😞

* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

WHO ARE YOUR "NEIGHBORS"?

■ **ALL NEIGHBORS**
Approximately 100 occupied nearby homes that are similar in size to yours (avg 1,819 sq ft) and have both electricity and natural gas service.

■ **EFFICIENT NEIGHBORS**
The most efficient 20 percent from the "All Neighbors" group.

Last 12 Months Neighbor Comparison

⚡ Electricity | 14% more electricity than your efficient neighbors

🔥 Natural Gas | 54% more natural gas than your efficient neighbors. This costs you about \$476 EXTRA per year.

Personalized Action Steps

Find more ways to save

Clean or replace furnace filters regularly

Improve insulation and seal air leaks

TURN OVER TO LEARN MORE ➡



Original Program Design

- Served 39,755 households
 - Dual Fuel
 - Single Family Homes
 - Target Geographic Region (east King County)
- Experimental Design Framework
- Monthly and Quarterly Reports



Evaluation Results

- Primary Evaluation Purpose:
 - Measure persistence of savings over the three years of the program implementation
 - Measure savings differences between monthly and quarterly recipients
 - Understand how savings persist when people are dropped off of the reports
 - Identify behaviors being taken to yield savings



Evaluation Approach

Two methods:

1. Difference-in-Difference

- Easy and simple for purposes of post-program savings claims
- Does not account for weather

2. Regression approach

- More complicated approach
- Accounts for weather – allows us to compare usage changes from year to year



Evaluation Results- Regression Approach

Year and Group	Electric (kWh)	Gas (therms)
Year 1	169.7 (149.70, inf.)	10.7 (9.27, inf.)
Year2	234.5 (207.25, inf.)	13.5 (11.61, inf.)
Year 3 - Continued	274.2 (238.01, inf.)	11.9 (9.95, inf.)
Year 3- Suspended	216.4 (169.77, inf.)	11.9 (8.85, inf.)

- I. Suspended homes obtained 79% of the continued group electric savings in year three; gas savings are statistically identical between treatment groups.
- II. Electric savings are growing at a decreasing rate
- III. Gas savings went down slightly.



Monthly Vs. Quarterly

Report Frequency	Year and Group	Electric (kWh)	Gas (therms)
Monthly	Year 1	184.6 (162.6, inf.)	11.3 (9.76, inf.)
	Year2	253.0 (222.99, inf.)	14.5 (12.46, inf.)
	Year 3 - Continued	300.6 (260.11, inf.)	14.2 (11.60, inf.)
	Year 3- Suspended	225.7. (172.29, inf.)	10.3 (6.85, inf.)
	Year 1	132.3 (101.50, inf.)	9.1 (6.89 inf.)
Quarterly	Year2	187.9 (145.84, inf.)	10.9 (8.03, inf.)
	Year 3 - Continued	207.0 (148.37, inf.)	6.1 (2.35, inf.)
	Year 3- Suspended	193.3 (112.81, inf.)	15.8 (10.59, inf.)



Monthly Vs. Quarterly

- Monthly recipients saved more electricity than the quarterly recipients, all three years.
- Monthly and quarterly gas savings are only statistically different in program year three
 - Quarterly suspended treatment group saved more gas in program year three than the continued quarterly group; and the suspended quarterly group gas savings were not statistically different than the continued monthly group gas savings



Joint Savings analysis

- Joint Savings Analysis:
 - Understand HER Impact on uptake of PSE programs
 - Avoid double counting savings with other PSE programs
- Upstream Program Savings
 - Use of Survey of customers to understand PSE & NEEA lighting purchases
- Rebate Program Savings
 - Utilized PSE program tracking data



Uptake in PSE Rebate Programs

HER Period	Count		Percent	
	Control	Treatment	Control	Treatment
Program Year One	902	772	2.43%	2.64%
Program Year Two	652	537	1.75%	1.82%
Program Year Three	1522	1218	4.11%	4.15%



Uptake in CFLs In 2011

Average # per household	Control Group	Continued Treatment Group	Overlap Bulbs or Fixtures (T - C)	Confidence Interval*
Program CFL Bulbs				
Purchased	5.97	5.94	-0.03	(-0.97 , ∞)
Installed	4.01	4.12	0.12	(-0.55 , ∞)
Program CFL Fixtures				
Purchased	0.09	0.15	0.06	(-0.08 , ∞)
Installed	0.08	0.09	0.01	(-0.08 , ∞)



Going through the Big D – Double Counting

- Load shapes weighted savings for measures installed through PSE programs
- Savings from other PSE programs are carried out for their remaining useful life
- Load Shape weighting savings and carrying them out over the effective lifetime allows us to fully understand the marginal impact of successive HER years



Total Joint Savings – Continued Group

Installation Year	Measurement Year		
	Year 1	Year 2	Years 3
Gas: Annual Therms per Household			
Program Year One	0.15	0.45	0.45
Program Year Two		0.38	0.61
Program Year Three			0.19
Total Joint Savings	0.15	0.83	1.25
Electric: Annual kWh per Household			
Program Year One	0.1	0.48	0.48
Program Year Two		0.53	-0.46
Program Year Three			-0.38
Total Joint Savings	0.1	1.01	-0.36



Program Savings- Net of Joint Savings

Group	Savings Category	kWh Year	Therms/Year
Continued Reports	Per Household Measured Savings	278.4	12.9
	Per Household Joint Rebate Program Savings	-0.0	1.3
	Per Household Joint Upstream Savings	2.3	n/a
	Per Household Savings Less Joint Savings	276.4	11.6
	Total Group Savings Credited to HER Program (1000s)	5,444	228
Suspended Reports	Per Household Measured Savings	208.1	12.0
	Per Household Joint Rebate Program Savings	0.5	1.0
	Per Household Joint Upstream Savings	43.3	n/a
	Per Household Savings Less Joint Savings	164.3	10.9
	Total Group Savings Credited to HER Program (1000s)	1,590	106
All Treatment Groups: Total Savings Credited to HER Program (1000s)		7,034	334
Lower bound of 95% Confidence Interval (1000s)		4,866	267



Behaviors

What are people Doing to Save Energy?

PSE Surveyed 1,396 participants and non-participants to understand:

- Energy Efficient Purchases (Efficient Equipment)
- Energy Efficient Behaviors (Turning off lights)



Survey Results

- Relatively few behaviors produced significant results between treatment and control groups
- Differences in energy efficient purchases were few
- Domestic water heat and Continued Treatment Group:
 - Bought more energy efficient water heaters
 - Installed more energy efficient washing machines
 - More domestic hot water-related energy savings behaviors than the control group.



Recommendations- Implementation

1. Random experimental design
 - If you aren't a large enough utility to do this, consider making a partnership with neighboring utilities
2. Send Reports to high energy users
 - Several studies (not just ours) have identified high pre-program users as the homes which save the most energy in this program
3. Don't Forget about evaluation
 - It takes a lot of customers to measure savings this small



Evaluation Recommendations

1. Get your evaluation staff involved early
2. Random experimental design
3. Large enough sample
 - Consider move out rates, opt out rates, and % of homes that might have bill histories that aren't useful
4. Consider Needed Data
 - Are you interested in savings only?
 - Billing Analysis
 - Are you interested in behaviors too?
 - Billing Analysis & surveys
 - What is your double counting policy?
 - Billing Analysis, surveys, and program tracking data
5. Be familiar with LB&L guidelines for behavior evaluation



Contact Information

Bobbi Wilhelm

Sr. Analyst

Puget Sound Energy

425.462.3432

bobette.wilhelm@pse.com

Joel Smith

Program Manager

Puget Sound Energy

425.456.2437

joel.smith@pse.com